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ABSTRACT

The document presents an overview of Stony Acres, a "sanctuary" for wildlife as well as a place for recreation enjoyment and education undertakings. A review of the history of wildlife habitat management at Stony Acres and the need for continued and improved wildlife habitat management for the property are discussed in Chapter I. Chapter II identifies the five wildlife types and species (fish, amphibians, reptile, birds, mammals) inhabiting Stony Acres during all or part of the year and describes their habitat requirements. Chapter III analyzes the habitat types (forests, fields, ponds, streams, spring season wet areas) throughout the property. Recommendations for wildlife habitat improvement practices and projects are proposed in Chapter IV. Chapter V mentions future directions for wildlife education research on the property. Chapter VI provides a description of budgetary considerations. A 27- item bibliography and appendices containing charts, maps, and tables conclude the document. (ERB)

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A WILDLIFE HABITAT IMPROVEMENT PLAN

Report to the Board of Directors
of
Stony Acres, Inc.

Summer 1983

RC 014824

"There are some who can live without wild things. and some who cannot.

Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher 'standard of living' is worth its cost in things natural, wild and free ... the opportunity to see geese is more important than television, and the chance to find a pasque-flower is a right as inalienable as free speech.

We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect. There is no other way for land to survive the impact of mechanized man, nor for us to reap from it the esthetic harvest it is capable...of contributing to culture."

- Aldo Leopold, father of wildlife management, from his book, Sand County Almanac

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S. Elaine Rogers, Ed.D.
Property Development Coordinator
Summer 1983

Chapter I

Introduction and Purpose

In May 1980 the Board of Directors of Stony Acres, Inc. approved its first master planning report. Among the property planning recommendations was the following:

> "The board should undertake land management projects to protect and enhance the natural resources of Stony Acres for both recreational and educational uses."

This recommendation specifically directed attention to three project areas: soil and water conservation, woodland management, and wildlife habitat improvement. The inclusion of wildlife habitat improvement projects was consistent with the previously approved (February 1980) "Position Statement of the Board Concerning the General Purpose of Stony Acres." Within this position statement the Board determined that Stony Acres should continue to be managed as a wildlife sanctuary. Recreational and educational use of the property should be consistent with this designation. At a later meeting (March 1981) the Board reaffirmed the existing policy that no hunting, snowmobiling, or motorcycling be allowed as recreational pursuits, partly because of their potential for disturbance of wildlife.

During the 20-year history of Stony Acres (1962-1982), various wildlife projects for recreational and/or educational purposes have been undertaken, including the following:

1962 - property was purchased
1963 - designation as a wildlife sanctuary
- construction of the pond
1966 - ESSC Natural History Club set up bird feeders
(early) 1970 - pond was stocked and fishing equipment was purchased
(late) 1970 - mowing practices modified to allow portions of the fields to "go back to nature"
- level of pond maintained during summer by turning on well
1980-82 - new bird feeders and nests were built and erected
- salt licks set out in fields
- trail system under construction to enhance opportunities for wildlife observation

Thus, the Board of Directors, the General Managers, the Caretakers and interested faculty and students have contributed through the years toward the development and maintenance of the property with wildlife in mind. What the board and others have lacked through these years has not been interest, but

rather an organized assessment of our wildlife, the status of our property as wildlife habitat, and a logical plan of action toward improvement of habitat.

The purpose of this document is to provide an organized plan for wildlife habitat management of Stony Acres. It is necessary at this time to think through our management purposes as they relate to the wildlife that use Stony Acres as their "home." Construction-related development on the property (trail system, ropes course, lodge) has increased in recent years. It is timely and appropriate that in the midst of our facility developments and improvements we take time to consider their impact upon our wildlife resources. Stony Acres as a "sanctuary" for wildlife must be managed to retain and enhance those characteristics which moved the property's founders to designate it as such. Habitat improvement is necessary in order to enhance the quantity and diversity of wildlife for recreational enjoyment and educational undertakings.

The process for developing this document has been to:

1. Review the history of wildlife habitat management at Stony Acres.
2. Establish the need for continued and improved wildlife habitat management for the property.
3. Identify the wildlife types and species inhabiting Stony Acres during all or part of the year and describe their habitat requirements.
4. Analyze the habitat types throughout the property.
5. Propose recommendations for wildlife habitat improvement practices and projects.
6. Suggest future directions for wildlife education and research on the property.
7. Provide a description of budgetary considerations.

It should be noted that this plan addresses wildlife habitat management as distinguished from management of the animals themselves. With one exception, no consideration will be given to manipulation of such factors as population and disease except as they are impacted upon by habitat improvement. The purpose of this plan is to provide recommendations for optimum provision of food, water, cover and living space requirements for the wildlife inhabitants of the property. Hunting is not allowed on the property and will not be considered as a wildlife management tool. Hunting is allowed on adjacent properties and should serve to control populations of transient animals such as deer and bear. The only exception to the above will be in the case of fishing which is an allowed form of recreation and which may be used as a management tool to maintain optimum ratio of bass and bluegill populations in the pond.

Chapter II

Identification of Wildlife at Stony Acres and Description of Their Habitat Requirements

One of the first steps in developing a wildlife habitat management plan is the identification of types and species of animals to be considered for management attention. Answering the question "What do we have here?" is a prerequisite to recommending habitat improvements.

Five types of fauna will be considered for management attention at Stony Acres:

Fish (Class Osteichthyes)
Amphibians (Class Amphibia)
Reptiles (Class Reptilia)
Birds (Class Aves)
Mammals (Class Mammalia)

These classes include the freshwater and land-dwelling types of vertebrate animals to be found at Stony Acres.

It should be noted that even though lower forms of animals, i.e. the invertebrates, are not considered for direct management in this plan, their presence and numbers do affect the status of the higher animals. This is especially true where the higher animals utilize invertebrate forms for food. For example, some types of birds depend upon insects as a main food source. In recent decades the use of certain pesticides to control overpopulation of specific insect pests has indiscriminately lowered the populations of non-target insects and thus, ultimately, affected those animals dependent upon them for food. Any action we take in management of the property will have direct and far-reaching consequences for the wildlife there. We should be mindful of our management actions and take into consideration their environmental impacts.

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FISH (Class Osteighthyes)

The pond at Stony Acres serves as habitat for largemouth bass and bluegill. This stocking combination is common in the eastern U.S. for small ponds. When the optimum ratio of these fish is maintained, 100 bass:1000 bluegill per acre, a balanced situation will exist. The bass serve as predators to hold the prolific bluegill in check. Bass will also eat worms, insects, crayfish and amphibians. The bluegill eat aquatic plants and insects. They also eat the eggs and fry of bass and when they disproportionately outnumber their stocking companions, they may reduce the bass population and show stunted growth themselves. Both fish have the following habitat requirements:

1) optimum living space (as mentioned above)
2) ample food supply (as mentioned above)
3) sand and/or gravel bottom for nest-building
4) water temperature of approximately 60-75 degrees F. in summer for egg laying
5) aquatic plants and pond bottom configurations to provide cover for small fish to hide from larger fish and other predators.

Rock bass and pumpkinseed have also been identified in samples taken from the pond. These and any other sunfish besides the bluegill should be discouraged as they will tend to upset the ratio mentioned above.

AMPHIBIANS (Class Amphibia)

Frogs, toads and salamanders comprise the group of animals known collectively as amphibians. A thorough field identification of these animals has not been conducted. According to Hobart Smith's A Guide to Field Identification of Amphibians of North America (1978), the following species may be found at Stony Acres, since their range includes eastern Pennsylvania. Some species have been found on the property and these are noted below.

Frogs and Toads:

Eastern spadefoot toad
*American toad
Common toad (Fowler's)
Northern chorus frog
*Lesser gray tree frog
*Peeper tree frog ("spring peeper")
*Wood frog
*Bullfrog
*Green Frog
*Northern leopard frog
*Pickerel frog

Salamanders

Mudpuppy
*Spotted salamander
*Marbled salamander
Jefferson's salamander
*Northern dusky salamander
Mountain salamander
Two-lined salamander
Long-tailed salamander
Red salamander
Spring salamander
*Red-backed salamander
*Slimy salamander
Four-toed salamander
*Eastern newt (red-spotted)

Habitat Requirements:

Amphibians spend their lives partly in fresh water, partly on land. Even on land they must have moist places to live such as rain pools, swampy areas, moist soil, wet areas under and between rocks, rotting logs, and leaves on the ground.

*Identified at Stony Acres.

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All amphibians are predatory carnivores in the adult stage, meaning that they prey upon other smaller animals for food such as worms, insects and spiders.

While in water amphibians need sheltered areas such as pond weeds and rocks to escape predation by fish and other animals.

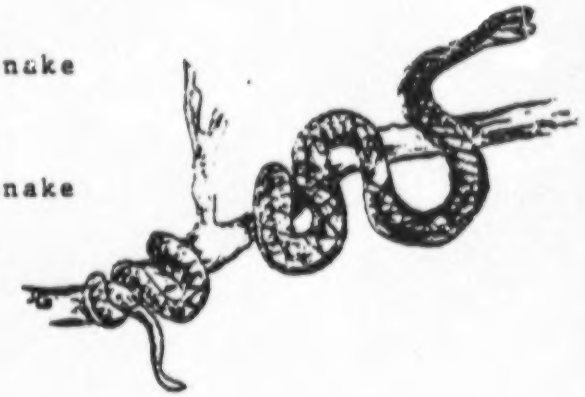
REPTILES (Class Reptilia)

Snakes, turtles and lizards make up the group of animals known collectively as reptiles. A thorough field identification of these animals has not been conducted. According to the Pennsylvania Fish Commission's booklet entitled Pennsylvania Reptiles and Amphibians (1976), the following species are most likely to be found at Stony Acres. Species that have been identified are noted.

Snakes

A. Non-poisonous:

- *Eastern hognose snake
- *Northern ringneck snake
- *Eastern garter snake
- *Eastern ribbon snake
- Eastern smooth green snake
- Northern brown snake
- *Northern water snake
- *Black rat snake
- Northern red-bellied snake
- Northern black racer
- *Eastern milk snake



B. Poisonous:

- *Northern copperhead
- *Timber rattlesnake

Turtles

- Spotted turtle
- Stinkpot turtle
- *Wood turtle
- *Eastern box turtle
- *Eastern painted turtle
- Bog turtle (endangered)
- *Snapping turtle

Lizards

None

Habitat Requirements:

Snakes require appropriate cover by day and an abundant supply of food for hunting mostly at night. Appropriate cover

*Identified at Stony Acres.

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would be rock walls and ledges, fields with tall grasses and woods. Snakes eat smaller animals: worms, insects, fish, amphibians, other snakes, bird eggs and young birds, and rodents. Most snakes prefer to be left alone.

Turtles prefer ponds, streams and wet areas in or near woods. They eat insects primarily, although some turtles such as the Eastern painted turtle also eat aquatic plants.

BIRDS (Class Aves)

One of the most popular wildlife-oriented recreational activities in the U.S. today is birding -- the observation and identification of birds. Individuals, classes and community groups have visited Stony Acres through the years to identify, study and undertake projects for the encouragement of bird populations deemed to be aesthetically enjoyable and useful on the property. Nevertheless, the identification of our bird residents has been piecemeal; no thorough systematic inventory has been conducted.

Following is a list of the order groupings of birds which are represented at Stony Acres with a list of species by common name that have been thus far identified. (S=Summer, W=Winter, A=all year)

Waterfowl (Order Anseriformes)

Most frequently seen:	Occasionally seen:	
Canada Goose (S)	Pied-billed grebe (S)	Black duck (A)
Mallard (S)	Wood duck (S)	Ruddy duck (S)
	Green-winged teal (S)	

Vultures, Hawks, and Falcons (Order Falconiformes)

Turkey vulture (S)	Red-shouldered hawk (A)	Cooper's hawk (A)
Red-tailed hawk (A)	Broad-winged hawk (S)	
	Sharp-skinned hawk (A)	Osprey (S)

Gallinaceous Birds (Order Galliformes)

(Chicken-like land birds)

Turkey (A)
Ruffed grouse (A)

Herons (Order Ciconiformes)

Great blue heron (S) — Black-crowned night heron (S)
Green Heron (S)

Shorebirds (Order Charadriformes)

Killdeer (S) — Spotted Sandpiper (S) — Woodcock (S)

Pigeons and Doves (Order Columbiformes)

Mourning dove (A) — Rock Dove (A)

Owls (Order Strigiformes)

Great horned owl (A) — Barred owl (A)
Screech owl (A) — Long-eared owl (A)

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Goatsuckers (Order Caprimulgiformes)

Nighthawk (S)
Whip-poor-will (S)

Hummingbirds (Order Apodiformes)

Ruby-throated hummingbird (S)

Kingfishers (Order Coraciiformes)

Belted kingfisher (S)

Woodpeckers (Order Piciformes)

Yellow-shafted flicker (A)
Pileated woodpecker (A)
Yellow-bellied sapsucker (S)
Hairy woodpecker (A)
Downy woodpecker (A)
Red-bellied woodpecker (A)
Red-headed woodpecker (S)

Perching Birds (Order Passeriformes)

Eastern Kingbird (S)
Eastern phoebe (S)
Eastern wood pee wee (S)
Barn swallow (S)
Tree swallow (S)
Blue jay (A)
Crow (A)
Black-capped chickadee (A)
Tufted titmouse (A)
White-breasted nuthatch (A)
Red-breasted nuthatch (A)
House wren (S)
Carolina wren (A)
Mockingbird (A)
Catbird (S)
Brown thrasher (S)
Robin (S)
Wood thrush (S)
Hermit thrush (S)
Veery (S)
Eastern bluebird (S)
Cedar waxwing (A)
Starling (A)
Red-eyed vireo (S)
Warblers: (S)
- Black and white warbler
- Blue-winged warbler
- Yellow warbler
- Magnolia warbler
- Black-throated blue warbler
- Blackburnian warbler
- Chestnut-sided warbler
- Prairie warbler
- Ovenbird
- Northern waterthrush
- Yellow throat
- Hooded warbler
- American redstart

House sparrow (A)
Red-winged blackbird (S)
Common grackle (S)
Brown-headed cowbird (S)
Baltimore oriole (S)
Scarlet tanager (S)
Cardinal (A)
Rose-breasted grosbeak (S)
Evening grosbeak (A)
Indigo bunting (S)
Purple finch (W)
Pine grosbeak (W)
Common redpoll (W)
Pine siskin (W)
Goldfinch (A)
Rufous sided towhee (A)
Slate-colored junco (A)
Tree sparrow (S)
Chipping sparrow (S)
Field sparrow (S)
White-throated sparrow (A)
Fox sparrow (W)
Song sparrow (A)

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The birds found at Stony Acres vary a great deal in their requirements for food, cover, nesting locations and living space. A general description of their requirements is given below.

Although several species of waterfowl have been observed at Stony Acres, Canada geese and mallards may be seen most frequently on or around the pond during spring and fall migrations when there is little activity to disturb them. They are not likely to nest on the property because the pond is too small to accommodate both recreational canoeing and quiet locations for nests. The birds stop over to rest and feed; they eat grain, insects, and aquatic plants. The pond is also favored habitat for the herons and the belted kingfisher who frequent its edges in search of fish, amphibians, crayfish, insects and small rodents.

The Ruffed grouse is Pennsylvania's state bird and has been observed on numerous occasions in the woods at Stony Acres. This bird nests on the ground sheltered by a tree, log or bush. Its food consists mainly of acorns and other wild nuts. The turkey also nests on the ground and is cautious about coming near buildings, preferring to stay in the woods. This bird eats nuts, grains, seeds and insects. It may be spotted feeding in fields.

The birds of prey to be found at Stony Acres are very likely nesting there and protecting their territory. Hawks and owls feed primarily upon small mammals and occasionally eat amphibians and snakes. Hawks build open nests high in trees while owls raise their young in unlined cavities of dead trees or nesting boxes.

The nighthawk and whip-poor-will may be seen at dusk feeding on insects in flight. They do not build a nest but lay eggs on open ground in woods, fields or rocky areas.

Woodpeckers are an especially enjoyable group of birds to observe and study at Stony Acres. They are useful in property management because they eat great quantities of insects that damage trees. These birds generally require hollow trees for nesting, but some species will use nesting boxes. The hairy and downy woodpecker will readily come to suet feeders in the winter when insects are most difficult to find.

The most numerous birds at the Acres are likely the perching birds. Their habitats generally are woods and fields. Nesting locations vary by species -- some nest in trees, some in bushes or high grasses, some on buildings and some on the ground. Many will utilize nesting boxes. Most of these birds eat insects and thus are beneficial to management of the property. Some of them, e.g. the robin, eat worms. Most of them will also eat seeds and berries. The all-year

residents such as the chickadee, nuthatch, titmouse, sparrow and junco will readily eat from bird feeders.

MAMMALS (Class Mammalia)

Stony Acres is an excellent location for the study and observation of mammals and their animal signs. Following mammal tracks in the winter snow while hiking, skiing or snow-shoeing is a favored activity.

Following is a list of species which may be found at Stony Acres since their range includes eastern Pennsylvania. Species that have been sighted on the property are noted.

Pouched Mammals

Oppossum

Insect-eating Mammals

Masked Shrew
Smoky Shrew
Longtail Shrew
Shorttail Shrew
*Starnosed mole
*Eastern mole
Hairytail mole

Bats

Keen bats
*Little brown bat
Indiana bat (endangered)
Small-footed bat
Silver haired bat
Eastern bat
Red bat
*Big brown bat
Hoary bat

Flesh-eating Mammals

*Black bear
*Raccoon
Shorttail weasel
*Longtail weasel
Mink
*Striped skunk
*Red Fox
*Gray Fox
Bobcat

*Sighted at Stony Acres.

Rodents

*Woodchuck
*Eastern chipmunk
*Eastern gray squirrel
*Red squirrel
*Flying squirrel
*Beaver
*White-footed deer mouse
*Eastern woodrat
Southern bog lemming
*Boreal redback vole
*Meadow vole
Pine vole
*Muskrat
Meadow jumping mouse
Woodland jumping mouse
*Porcupine
Snowshoe hare
*Eastern cottontail rabbit

Hoofed Mammals

*Whitetail deer

Habitat Requirements:

Opossums are found in woods and around farm properties. They nest in hollow trees and brushpiles. Their diet consists of insects, fruits, nuts and carrion.

Shrews and moles prefer moist areas in woods and fields, feeding primarily on insects, worms and, in the case of the shrew, other small mammals. Shrews will nest in stumps, logs and rockpiles, while moles build similar nests of leaves and grass underground.

Bats can be seen at dusk at Stony Acres flying erratically over the fields and pond taking insects in flight. They sleep during the day in caves, hollow trees and buildings.

Black bears have been observed at Stony Acres but it is believed they are merely "passing through" since their home range is approximately 15 miles. They eat berries, nuts, insects, small mammals, honey, carrion and garbage. They den in caves or hollow logs or trees. It is not known if any black bears hibernate on Stony Acres property.

Raccoons are spotted occasionally in the woods or near water, sometimes in cavities of hollow trees where they den. These animals are chiefly nocturnal feeders and they eat fruits, nuts, insects, crayfish, amphibians and bird eggs.

*Sighted at Stony Acres.

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Weasels and mink are similar in their habitat requirements. Both animals prefer to live in wooded areas near water. They will nest in stumps or rockpiles and feed upon mice, young birds and other small animals.

The striped skunk does not hibernate in winter. Its tracks may be seen in the snow after a night of hunting. The skunk is omnivorous, feeding on mice, eggs, insects, grubs, berries and carrion. It dens in the ground, woodpiles or rockpiles.

Foxes may also be seen in winter. Their diet consists of animals from insects to rabbits plus berries and fruits. They build dens in hillsides or large rocky areas.

The elusive bobcat has not been identified at Stony Acres but it is likely that the animal at least passes through since it has been spotted on nearby properties. It is nocturnal, feeding on small mammals and birds, returning at dawn to its den in a rock crevice or hollow log.

Underground woodchuck dens have been found in the wooded areas of the Acres. These animals hibernate in winter but feed on young plants when they are active the remainder of the year.

Chipmunks and squirrels are similar in their habits. They prefer woods or brushy areas. Chipmunks build nests in stumps or rockpiles while squirrels prefer holes in trees or leaf nests among tree branches. These animals eat insects, seeds, fruits, nuts, and fungi.

Beavers have been seen on the property and they do live on nearby properties. They may someday wander over to establish a home on the Acres by damning a stream and building a lodge.

Mice and voles may be found nesting and tunneling in the fields in grasses or snow. Their diet consists of seeds, nuts and insects.

Muskrats are seen from time to time around the pond. They will dig tunnels in the banks of the pond leading to underground burrows. Muskrats eat aquatic plants, fish and amphibians.

The porcupine may be seen night or day, all year round, mostly climbing in trees, where it feeds on buds, twigs and the inner bark of trees. It dens in hollow trees on rock caves, but does not hibernate. The porcupine is fond of salt.

A favorite of wildlife observers all year round, the eastern cottontail rabbit is found in tall grasses, brushy areas and woods where they prefer to den in brushpiles. They eat twigs and bark in winter and young green vegetation in spring and summer.

Another favorite and frequently seen mammal at the Acres is the whitetail deer. Deer may be seen all year round in the woods, crossing the fields or at a salt lick. Deer browse on twigs, shrubs, grasses, fungi and acorns.

Chapter III

Identification of Habitat Types

At least five habitat types may be identified on the property:

A. Forests
B. Fields
C. Pond
D. Streams
E. Spring season wet areas

the location of these habitat types is noted on the map of the property on page .

Following is a discussion of each type:

A. Forests - As identified in the Forest Management Plan for Stony Acres (approved by the Board of Directors, October 1982) the forests on the property are divided into 3 categories: mixed oak, white pine-hemlock and planted spruce.

The majority of the property is composed of this habitat type and it is here that we are likely to find such animals as whitetail deer, turkey, grouse, squirrels, snakes, owls and songbirds. Many of the animals identified on the property have dens or nests in the trees, rock ledges or rock piles of these forest areas.

Management of these forest areas for timber production, at least for our own firewood production, must be coupled with appropriate management for wildlife-oriented recreational and educational use.

B. Fields - The open fields on the property amount to approximately 3-4 acres. Portions of this area are allocated for recreational use with use areas consisting of a picnic area, volleyball area, parking area, campfire circles (2), and trails. These areas are mowed and the grounds maintained for the intended recreational uses. The remaining portions of the fields are not mowed. There are several stone walls which remain from the days when the property was a farm and these walls served as pasture borders. There is one brush pile established for wildlife cover located between the picnic area and the cabins. Associated with the open fields and stone walls and brushpile are small mammals such as chipmunks, woodchucks and weasels; songbirds; snakes; and larger birds and mammals such as turkey and deer which come out of the cover of the forests at dawn or dusk to feed.

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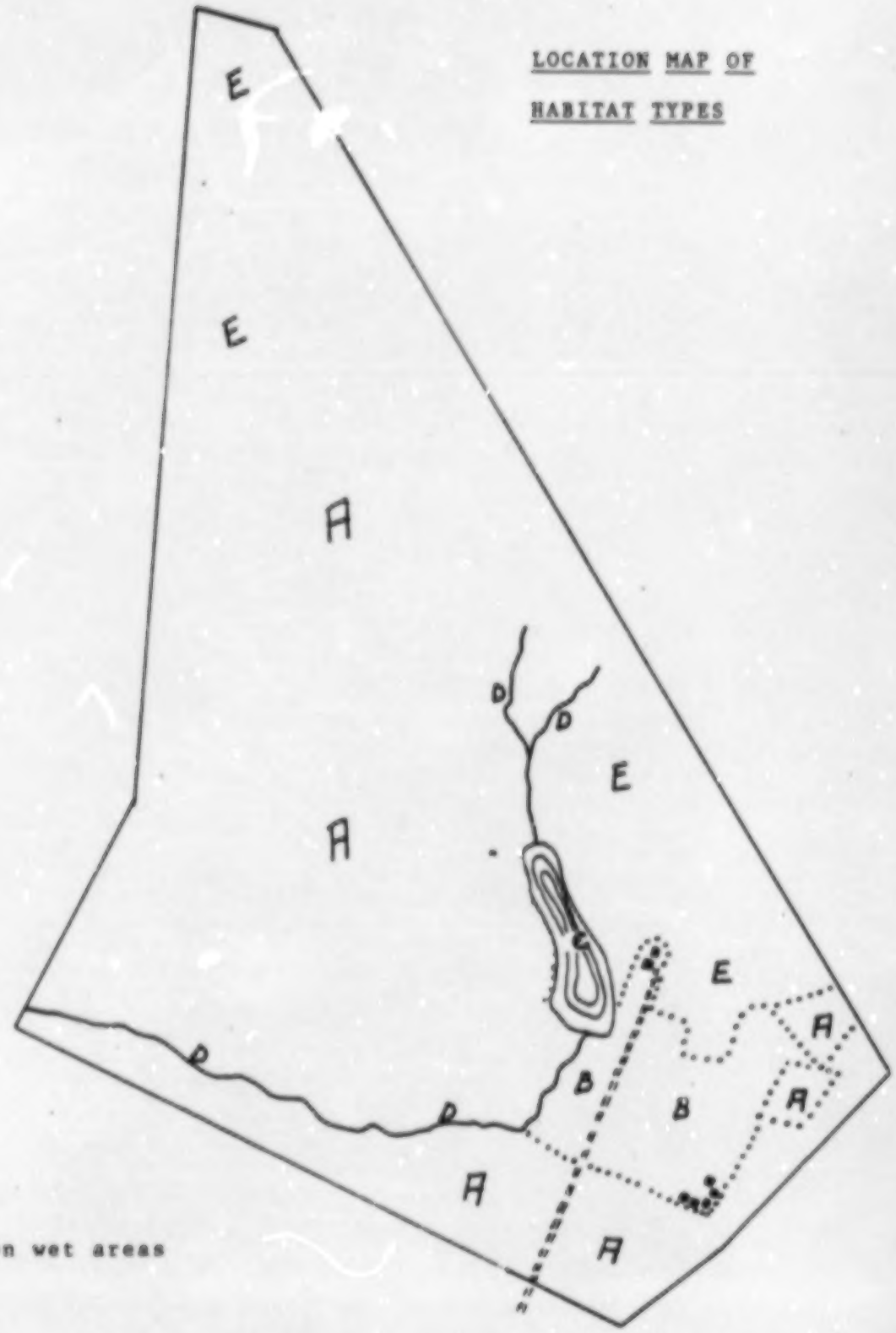
C. Pond - the 1-1/2 acre pond at Stony Acres is man-made. It was constructed in the mid 1960's by a private contractor and with technical assistance from the USDA Soil Conservation Service. Shortly thereafter, the pond was stocked with bass and bluegill. In addition to these fish one can find in or around the pond a variety of amphibians; snakes, birds such as osprey, herons and kingfishers; and mammals that come to the water's edge such as deer and raccoons.

D. Streams - There are two main streams on the property -- the one flowing into the pond and the stream flowing out of the pond. The stream flowing into the pond is constant. At the upper end of the stream are several natural springs which fed into it. A small man-made pond also is located in the vicinity of these springs (see map). The stream flowing out of the pond may be intermittent during especially dry years. Its flow, of course, depends upon the level of the pond. Associated with these streams are a variety of insect larvae (serving as food for higher animals), amphibians, reptiles, birds and mammals. Some of these animals make their nests very close to streams, such as the water thrush. Most animals will utilize these streams at least as a source of drinking water.

E. Spring season wet areas - These areas may seem insignificant to the casual observer, but they are vital areas for drinking water for most animals as well as breeding places for insects and amphibians. These areas include two small bogs on the property, small spring-time streams that flow with heavy rainfall and depressions containing standing water for short periods of time. These areas are well scattered throughout the property and attract a variety of wildlife.

LOCATION MAP OF
HABITAT TYPES



KEY

A=Forests
B=Fields
C=Pond
D=Streams
E=Spring season wet areas

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Chapter IV

Recommended Habitat Management Practices and Projects

Approximately 150 species of animals have been identified at Stony Acres as either permanent residents of the property or as occasional visitors. At least 5 habitat types have been identified on the property and described in this booklet. The purpose of this chapter then is to discuss recommendations for improving and maintaining optimum habitat through appropriate management.

"Habitat" may be defined as the place where an animal lives which provides for it the appropriate combination of food, cover, water and living space to meet its needs.

The primary habitat management goal for Stony Acres should be to provide the widest variety of habitat conditions as as to encourage the greatest diversity of wildlife on the property.

Most habitat management practices are, in fact, vegetation management practices applied to the provision of food and/or cover for a variety of wildlife. While providing bird feeders and artificial bird houses and nesting is a worthwhile practice, it should be realized that a proper habitat management plan supplies as much food and cover as possible through natural vegetation.

Following is a list of management practices relating to vegetation:

1. Develop and follow a forest management plan which provides for a sustained yield timber management program.

   In October 1982 the Stony Acres Board of Directors approved a forest management plan developed by the Pa. Bureau of Forestry. Two types of timber harvesting practices should be considered, as described below.

   Selective cutting is used to thin out a stand of trees to favor certain trees grown for a particular purpose. At Stony Acres two areas of forest are receiving select cutting at present. The spruce plantations are being thinned to provide possible future merchantable timber. The oak ridge section of the wooded portion of the property is being thinned to provide firewood

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for use on the property. Selective cutting can also benefit wildlife by encouraging and sparing species which provide food and cover. Crown thinning rather than low thinning should be used to open the canopy. This method of harvesting should produce an uneven-aged stand of trees in the forest areas of mixed hardwoods. This will provide a diversity of vegetation, thereby accomplishing optimum food and nesting conditions for a variety of species.

Clearcutting is used to take out all trees of a given area in order to obtain a large quantity of wood for timber purposes and to start over with forest succession stages. Clearcuts are highly valuable to certain types of wildlife. They "open up" the forest floor to sunlight which encourages growth of shrubs and grasses for food and cover. This practice also provides edges within the forest. Edges are transition zones between two types of vegetation, such as forests and fields. If a clearcut is made in an irregular shape, rather than a simple square or rectangle, the amount of edge can be increased and provide increased benefits for wildlife. Animals such as deer, turkey and grouse are especially benefited by clearcutting. It is recommended that one or two clearcuts be maintained on the property.

In removing dead and dying trees during either type of harvesting, it should be remembered that these trees serve as sources of food (insects) and as den trees for many birds and mammals such as squirrels, raccoons, owls, woodpeckers, and porcupines. Several sources recommend that 5-6 such den trees be retained per acre. Dead trees taken should be primarily those that pose a danger to hikers along the trail system.

All harvesting should be done in fall and winter to avoid disturbance to nests and dens during nesting seasons.

(See especially the booklet, Timber Sales and Wildlife.)

2. Plant and/or encourage existing growth of certain species of trees, vines and shrubs which provide the most benefit to wildlife.

Trees:

Apple (crabapple)
Aspen
Beech
Birch
Cedar
Cherry
Dogwood

Hemlock
Hickory
Holly
Maple
Mountain Ash
Oak
Pine
Walnut

White oaks are better than red oaks and chestnut oaks as a food source. (See Table in the Appendix) Small maple trees may be cut back to encourage sprout growth, thereby providing more seed and cover for wildlife.

Shrubs/Vines:

Autumn olive
Blackberry
Blueberry
Cotoneaster
Elderberry
Firethorn
Greenbrier
Honeysuckle
Juneberry
Lespedeza
Mountain laurel
Multiflora rose
Privet
Rhododendron
Shadbush
Spice bush
Sumac
Sweet fern
Trumpet-creeper
Viburnum
Virginia creeper
Wild grape
Winterberry
Witch hazel

Shrubs and vines must of course be managed so that they are not allowed to take over an area and impede other uses. Landscaping around buildings should utilize plantings which also benefit wildlife. Hedgerows should be encouraged along field boarders, stone walls and pond edges.

3. Except for use areas in the open fields and around buildings, grasses and herbaceous plants should not be mowed.

Plants thought of by many people as "weeds" are in fact beneficial to many forms of wildlife. Their flowers attract insects and their seeds provide food. A list

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of common grasses and herbaceous plants that provide food for wildlife follows:

Crabgrass
Curly dock
Chickweed
Cinquefoil
Clover
Dandelion
Foxtail
Goldenrod
Lambsquarters
Milkweed
Nightshade
Panicgrass
Pigweed
Plantain
Pokeweed
Ragweed
Sedge
Sheepsorrel
Sunflower
Thistle
Wild strawberry

4. Plant food patches of grains near edges of fields and in clearcuts to provide additional food sources.

Possible food patches of:

Barley
Corn
Millet
Oats
Rye
Wheat

Grasses and herbaceous plants should be allowed to invade the food patches as they will provide additional food and cover.

5. Following harvesting in the woods, brushpiles should be formed out of the trimmings.

Unless the tree trimmings are intended for the woodchipper, these trimmings should be bunched into several small brushpiles in the woods to provide additional cover for small mammals and birds.

6. Provide as much variety in vegetation for food and cover as possible. Variety in types of vegetation and in growth stages of trees and shrubs will provide the greatest diversity in types and numbers of wildlife.

7. Landscaping for the new lodge should consist of plantings that provide benefits for wildlife.

In addition to vegetation management practices, other management practices may be applied at Stony Acres.

1. The stonewalls should neither be torn down nor "cleaned up" to the point of taking away valuable food and cover sources. These structures on the property provide shelter for several kinds of small mammals (weasels, chipmunks, deer mice) and snakes.

2. Roads and trails may be lined with small, natural gravel to supply grit for birds. This practice may become especially important when our roads are paved.

3. Before any pesticides, herbicides or algicides are used on the property, a thorough study of their environmental impacts should be made. If other methods can be used to meet the objective, it is recommended that we refrain from introducing toxic chemicals into the natural systems. Information concerning chemicals should be obtained from sources in addition to the manufacturer.

4. A program of artificial feeding for birds and small mammals should be continued but should be restricted to winter months only. As stated earlier, natural foods are preferable to an elaborate program of artificial feeding. However, during times of scarce food in the winter months, artificial feeding is a helpful supplement.

5. Construction or purchase of artificial nesting boxes should be continued and they should be checked yearly for repairs and for cleaning. Thus far, nesting boxes have been constructed or purchased for the following types of animals: small songbirds, owls, bluebirds, purple martins and swallows and squirrels. It is recommended that further consideration be given to providing nesting boxes for wood ducks, perhaps near the small pond upstream from the main pond.

6. Salt licks should continue to be purchased and put out in the fields for deer and other mammals.

The pond presents some special situations for habitat management. Following are several recommendations for this area:

1. Control excess aquatic vegetation growth. A variety of aquatic vegetation, i.e. algae and flowering aquatic plants, are desirable in certain numbers as

they provide food and cover for aquatic animals in the pond and for wildlife that frequent its edges. However, in excess, these same plants can "choke" a pond and rob it of oxygen important for the aquatic animals living there. Excess growth can also interfere with desired recreational uses of the pond. Mechanical means of controlling excess growth should be used where possible. The pond should be kept at maximum height during summer which may necessitate the use of the auxiliary well to pump water into the pond in especially dry months. Chemical means of control should be a last resort but used if it becomes necessary.

2. <u>The upper end of the pond should be maintained for maximum cover for wildlife</u>.

3. <u>Along the lawn edges of the pond, there should be an unmowed border of 1-2 feet</u>. This border will provide cover at the pond edge for small amphibians, reptiles and mammals and the plants allowed to grow naturally will provide food for some forms of wildlife as well.

4. <u>As much as possible, the fish population of the pond should be controlled for optimum ratio of bass to bluegill</u>. The optimum ratio of bass to bluegill in a pond is 100 bass to 1000 bluegills. Obviously, it is impossible to know at all times if this ratio is being maintained exactly, but certain measures can be taken to keep these fish at appropriate levels. Regulations should be established to assist in the management of these fish. For example, to maintain a population of bass large enough to prey upon the bluegill, no bass of less than 14" should be allowed to be taken. Bluegill should be fished heavily to keep their numbers in check. Failing to fish out the bluegill will result in overabundance of bluegill preying upon the fry of the bass. Competition for other food sources of both fish will also be stressed. Persons fishing at our pond should be required to report their catches to the caretaker. Records should be kept of the type of fish caught and their lengths. These records would assist in managing the populations of bass and bluegill in the pond.

Chapter V

Future Directions for Wildlife Education and Research at Stony Acres

The opportunities are practically endless for educational and research opportunities associated with wildlife at Stony Acres. It is important not only that we inventory our wildlife and properly manage the types of habitat we have on the property, but also that we encourage attention to and education about our wildlife resources. Academic departments, student groups on campus and appropriate off-campus groups should be encouraged to utilize Stony Acres for these purposes.

Briefly, a few examples of possible projects may be mentioned. The Biology Department could be utilizing Stony Acres as a field study site to a much greater degree than is done presently. Field courses such as Ornithology, Field Zoology, Aquatic Ecology and Environmental Studies should be encouraged to visit the property on field trips and to undertake student research projects. The observations and findings of these faculty and students would in turn help us to better manage this property. Photography and art classes could engage in projects or hold workshops on wildlife art and wildlife photography. Student groups, e.g. the Biology Club or the Raptor Club might be encouraged to undertake wildlife-related service projects such as the construction of a wildlife observation blind or habitat improvement projects. Recreation classes could develop written interpretive materials and exhibits to educate visitors and increase their enjoyment of wildlife while on the property. Off-campus groups interested in wildlife could be encouraged to hold educational workshops, conduct research or offer service projects.

It would seem appropriate that the Board should encourage wildlife education and research and should be willing to support such efforts with financial assistance for projects that would be to our advantage. Approval for expenditrues should naturally be on a project-by-project basis and would be dependent upon our total financial position at the time of any request. But the Board should be open to these requests and should in fact encourage them.

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Chapter VI

Budgetary Considerations

Providing that the Board of Directors of Stony Acres, Inc. accept the recommendations as described in this plan, several budgetary considerations should be noted. It would be necessary to purchase various items including the following:

A. bird seed - may be purchased in bulk to reduce costs. Suppliers include Meesing Nature Center or local businesses, such as Agway.

B. large containers for storage of bird seed - if bird seed is purchased in large quantities, it is necessary to store the seed in durable heavy plastic or metal containers to prevent damage by rodents and to keep the seed dry. Large plastic or metal garbage cans or clean drums would be appropriate.

C. lumber & hardware to make feeders and nesting boxes

D. salt blocks and appropriate storage containers

E. plantings - trees, shrubs and vines that we may wish to add to the property, especially as part of landscaping for the new lodge or around other buildings.

F. seed for food patches

It would appear that these purchases could be spread out over several years and could be absorbed by the "Special Projects" line of our budget.

It may be possible to obtain financial assistance from a variety of sources to help defray our costs. For example, the USDA Agricultural Stabilization and Conservation Service provides cost-sharing assistance for timber stand improvements. The Pennsylvania Game Commission provides certain types of trees and shrubs for wildlife plantings. These and other possibilities for financial assistance or products at reduced cost will be investigated.

The Board may also wish to consider miscellaneous expenditures for materials for student- or faculty-generated wildlife related research or projects. These expenditures should be for items that would remain on the property or be

expended during the course of the research or project. Approval for such expenditures should be on a project-by-project basis.

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APPENDICES

Woodsman, spare that tree for wildlife

When should a tree be cut down for firewood or left standing to feed and shelter wildlife? To help answer that question, U.S. Forest Service biologists Andrew B. Carey and John D. Gill rated the various values of several North American trees. The list below is a summary of their analysis. The best rule of thumb for maintaining a rich diversity of wildlife, the two scientists say, is to harvest wood only from the most abundant species of trees in a given area.

Tree	Value to wildlife	Value as firewood	Special qualities
Alder	*Good*	*Good*	*Attractive to birds in some areas*
Apple	*Excellent*	*Excellent*	*Beneficial to a wide variety of animals*
Ash	*Fair*	*Excellent*	*Supplies food in the fall*
Aspen	*Good*	*Fair*	*Especially attractive to grouse*
Balsam fir	*Fair*	*Fair*	*Good cover for snowshoe hares*
Beech	*Good*	*Excellent*	*Important for squirrels and other small mammals*
Birch	*Good*	*Excellent*	*Good habitat for upland game birds*
Black cherry	*Excellent*	*Good*	*May have high timber value; used by songbirds*
Black tupelo	*Fair*	*Fair*	*Important for birds in some areas*
Black walnut	*Fair*	*Excellent*	*High timber value when mature*
Cottonwood	*Fair*	*Fair*	*Good as kindling*
Dogwood	*Excellent*	*Excellent*	*Provides shelter for songbirds*
Elm	*Fair*	*Fair*	*High water content; hard to split at times*
Hackberry	*Fair*	*Excellent*	*Important winter food for songbirds*
Hemlock	*Fair*	*Fair*	*Attractive to northern wildlife*
Hickory	*Fair*	*Excellent*	*Especially attractive to squirrels*
Magnolia	*Fair*	*Good*	*Low wildlife value; good firewood*
Maple	*Good*	*Excellent*	*High aesthetic value in the fall*
Oak	*Excellent*	*Excellent*	*Valuable for a wide variety of animals*
Pine	*Excellent*	*Fair*	*Good songbird habitat*
Sassafras	*Fair*	*Good*	*Berries eaten by insectivorous birds*
Spruce	*Good*	*Fair*	*Important to northern wildlife*
Sweetgum	*Fair*	*Fair*	*High aesthetic value*
Sycamore	*Fair*	*Fair*	*High water content when green*
Yellow poplar	*Fair*	*Fair*	*Good as kindling*
Willow	*Fair*	*Fair*	*Attractive to northern wildlife*

Source: USDA Forest Research Note 259

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Typical Nesting Habits of Selected Non-Game Forest-Dwelling Birds

Species	Usual nest height, feet	Concealment	Remarks
Louisiana waterthrush	0	Roots, logs, banks	Near water
Ovenbird	0	Dead leaves	Usually in dry soil
Whip-poor-will	0	Dead leaves, brush	Deep woods, ravines
Brown thrasher	0- 7	Thickets	Prefers thorny vines
Carolina wren	0-10	Cavities, thickets	Often in a building
Rufous-sided towhee	0- 3	Grass, forbs	Brushy openings or deep woods
Song sparrow	0- 6	Grass, thickets	Edges of woods
Yellowthroat	0- 2	Grass, vines	Moist locations
American goldfinch	5-15	–	Forks of shrubs, saplings, vines
American redstart	5-15	–	Forks of shrubs, saplings, vines
Cardinal	3-15	Thickets	Prefers vine tangles
Gray catbird	2-15	Thickets	Prefers vine tangles
Chipping sparrow	1- 4	Thickets	Often near building
Indigo bunting	1- 3	Thickets	Brushy areas in, near woods
Yellow-breasted chat	3-10	Thickets	Often in thorny vines
Yellow warbler	2-10	–	In shrubs, saplings
Red-eyed vireo	2-15	–	Suspended from forks
Robin	2-15	–	Often on a building
Wood thrush	4-15	Thickets	In forks or on a limb
Black-capped chickadee	8+	Cavities	Often in old woodpecker hole, bird box
Downy woodpecker	6-30	Cavities	Dead tree or dead part of live tree
Screech owl	6-30	Cavities	Woodpecker hole, tree cavity, building, bird box
Tufted titmouse	8+	Cavities	Often in old woodpecker hole, bird box
White-breasted nuthatch	2-60	Cavities	Stump, snag, old woodpecker hole, bird box
Northern (Baltimore) oriole	20+	None	Prefers broad-crowned trees
Blue jay	10-15	–	May prefer conifers
Broad-winged hawk	20-80	None	Builds in a large crotch
Crow	20-80	None	Usually in a large crotch
Eastern wood pewee	20-60	None	Often on edge of clearing
Great crested flycatcher	6-15	Cavities	Tree or stump, woodpecker hole, bird box
Scarlet tanager	15-55	None	Usually in mature woods

For more detail concerning bird habitat management, ask for a copy of Research Note NE-192 from:

Information Services
Northeastern Forest Experiment Station
6816 Market Street
Upper Darby, Pa. 19082
(215) 596-1628

NE-INF-31-78

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TABLE 2

Expected Yields of Fresh Acorns in Pounds Per Tree for Some Oak Species Common to the Northeastern United States

Diameter of Tree at breast height	Black	Chestnut	Northern Red	Scarlet	White
10	1.1	0.9	0.4	2.5	1.9
12	1.7	3.0	2.2	3.9	3.6
14	2.3	5.0	5.7	5.6	5.2
16	2.8	6.0	10.0	8.0	6.9
18	3.4	8.1	14.5	12.1	8.6
20	4.0	8.9	15.8	14.8	10.2
22	4.6	9.8	17.1	17.5	12.0
24	5.2	10.1	15.4	17.9	13.6
26	5.8	10.5	13.8	18.3	15.2

NOTE: This Table can be used to estimate pounds of acorns per acre. A circular acre has a radius of 117.8 feet, and a square acre is 208.5 feet on a side. In good oak country, wildlife will use as much as 85 pounds of acorns per acre. This is why it is important to have at least half the woodland acreage in sawtimber stands containing large-diameter trees.

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SOIL MAP

Owner Stony Acres Inc Operator Same

County Monroe State PA

Soil survey sheet(s) or code nos. 15 Approximate scale 1" = 1667'

Prepared by U.S. Department of Agriculture, Soil Conservation Service cooperating with Monroe County Conservation District

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PA-CONS-11
REV. 1-73
(FILE CODE CONS-14)

USDA SOIL CONSERVATION SERVICE
HARRISBURG, PA.

SOIL SUITABILITY FOR WILDLIFE HABITAT

TABLE 7 Stony Acres, Inc.---- MONROE COUNTY, PENNSYLVANIA

SOILS AND MAP SYMBOLS	POTENTIAL FOR HABITAT ELEMENTS							POTENTIAL AS HABITAT FOR		
	GRAIN AND SEED CROPS	GRASSES AND LEGUMES	WILD HERBACEOUS PLANTS	HARDWOOD TREES	CONIFEROUS PLANTS	WETLAND PLANTS	SHALLOW WATER AREAS	OPENLAND WILDLIFE	WOODLAND WILDLIFE	WETLAND WILDLIFE
Chippewa & Norwich ext. stony loam, CnB	Very poor	Very poor	Fair	Fair	Fair	Poor	Very Poor	Poor	Fair	Very Poor
Lordstown very stony, LxC	Very Poor	Very poor	Good	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor
Swartswood ext. stony, SxB	Very poor	Very poor	Good	Good	Good	Poor	Very poor	Poor	Fair	Very poor
SxC	Very poor	Very poor	Good	Good	Good	Very poor	Very poor	Poor	Fair	Very poor
Volusia ext. stony silt loam, VxB	Very poor	Very poor	Good	Poor	Poor	Poor	Very poor	Poor	Poor	Very poor
Wurtsboro ext. stony, WxB	Very poor	Very poor	Good	Fair	Fair	Poor	Very poor	Poor	Fair	Very poor

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Description of Suitability Ratings – an adjective description of soil conditions which effect the growth of food and cover, construction of water impoundments, and the management of specific kinds of wildlife.

Wildlife Habitat Elements – ratings of Good (1) or all elements indicate that there is little or no soil–related problem. Ratings of Fair (2), Poor (3), and Very Poor (4) for each element are briefly explained below:

ELEMENT	FAIR	POOR	VERY POOR
Grain & Seed Crops	Requires a rotation with sod crops up to 66% of time. Seed production about average.	Requires a rotation with sod crops more than 66% of time. Seed production below average.	Soil conditions severely limit adapted species and management. Seed production very low and unreliable.
Domestic Grasses and Legumes	Requires fertilization and renovation to maintain stands. Growth and production average.	Species are limited; cultural practices difficult to apply. Growth and production below average.	Soil conditions make establishment or management impossible or impractical. Very sparse stands and poor vigor.
Wild Herbaceous Plants	Soils suitable for limited number of species. Growth and seed production about average.	Soils suitable for only a few species. Growth and seed production below average.	Soils unfavorable and adapted species few. Growth and seed production poor and unreliable.
Hardwood Trees	Soils suitable for dependable growth of adapted species. Growth rate and seed production average.	Soils severely limit the number of species. Growth rate and seed production below average.	Soils unfavorable to very few species of value to wildlife. Wildlife food and cover is insignificant.
Coniferous Plants	Soils suitable for dependable growth of adapted species. Growth rate and seed production average.	Soils severely limit the number of species. Growth rate and seed production below average.	Soils unfavorable to very few species of value to wildlife. Wildlife food and cover is insignificant.
Wetland Plants	Soils suited for food-producing annuals. Some perennials grow well. Growth rate and food production of annuals average.	Soils severely limit the number of species. A dominant stand of perennials with low food value is produced.	Soil conditions such that wetland plants do not grow.
Shallow Water Areas	Soils somewhat limited because of unreliable water levels or difficult to create and maintain shallow water areas.	Soils present serious construction problems or pose major difficulties in maintaining desired water levels.	Soils make it impossible or impractical to obtain sufficient water control to be of value.

Kinds of Wildlife – ratings reflect the suitability of creating, improving or maintaining habitat for following species:

Openland Wildlife – Pheasants, quail, cottontail rabbits, woodcock, mourning dove.

Woodland Wildlife – Deer, turkey, grouse, snowshoe hare, racoon, squirrel.

Wetland Wildlife – Geese, ducks, coot, snipe, rail, beaver, muskrat, mink.

*U.S.Government Printing Office:1975—689-008/83 3-1

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